Bremerton
Kitsap County
Health District

Scott W. Lindquist, MD, MPH, Director
109 Austin Drive
Bremerton, WA 98312

January 9, 2002

Ms. Judy Aitken
Department of Ecology - NWRO
Toxics Cleanup Program
3190 160th Avenue SE
Bellevue, WA 98008-5452

RE: USN BREMERTON AUTO WRECKING LANDFILL SITE HAZARD ASSESSMENT FILE DOCUMENTATION

Dear Judy,

The completed site hazard assessment (SHA) recommendation and supporting data from the Bremerton-Kitsap County Health District's (Health District) file are attached to this letter. If you have any questions or require further information please feel free to contact me at (360) 692-3611 ext. 241.

Sincerely,

Grant A. Holdcroft, R.S.
Environmental Health Specialist
Solid and Hazardous Waste Program

enc: USN Bremerton Auto Wrecking Landfill Documentation

rte: Jan Brower, BKCHD
Project file SHA 3.1

gah/swwqbcd/shw/common/sha/sites/bawl/bawlcovlet.doc

POULSBO ANNEX
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SITE HAZARD ASSESSMENT
USN Bremerton Auto Wrecking Landfill

January 9, 2002

Site Assessed for the February 26, 2002, Site Register

Site Name/Location (Street, City, County, Section /Township/Range, Facility ID Number):

USN Bremerton Auto Wrecking Landfill
4275 State Route 3
Port Orchard, WA 98367

Township: 23N
Range: 1W
Section: 1
Longitude: 122° 44' 29.4"
Latitude: 47° 30' 36.4"

Facility ID No. 62752314

Site Description (Include management areas, substances of concern, and quantities):

This site was listed on the Washington State Department of Ecology's (Ecology) Integrated Site Information System (ISIS) list in December 1997, after a review of the files performed by the Bremerton-Kitsap County Health District (Health District), and recommendations made to Ecology's Northwest regional office. The site is currently an undeveloped property with piles of waste composition roofing material, lumber, and other demolition debris on top of the landfill. The entire site is vegetated. The site is located adjacent to Airport Auto Wrecking, Too (Facility ID# 34492328), an active auto wrecking operation.

Historic Activities

The site is a closed and abandoned unlined, mixed municipal solid waste landfill that operated from 1968 to 1989. The landfill was sited in a ravine that Gorst Creek currently flows through. Gorst Creek is a salmon stream and 2.5 miles from the landfill empties into Sinclair Inlet of Puget Sound. During the start of fill operations a culvert was installed and the creek was piped under the landfill. The site received mixed municipal waste from the public and the United States Navy (USN) from the Puget Sound Naval Shipyard. Estimates from Health District records indicate that the landfill may hold as much as 30,000 cubic yards of waste.

Recent Site Activities

In March 1997 Health District staff discovered a slide from the south west corner of the landfill into Gorst Creek. The slide exposed waste on the face of the slope and dumped waste into the creek. The Health District worked with the owners of the site, the Washington State Department of Transportation (DOT), the US Navy, and other parties to stabilize the slope and remove waste from the creek. Sampling of the creek was conducted by the DOT in April 1997, and in October

2000 a site hazard assessment (SHA) was conducted by Hart Crowser for the Navy. The Health District has made numerous visits to the site over the last four years checking on the condition of the slope and stability. A major slope failure would threaten State Route 3 by blocking the culvert that runs under that road.

Sampling Summary

For this SHA no sampling was conducted by the Health District. Analytical results from the sampling conducted by DOT and the Navy were used for this SHA. The sampling results from the two studies indicate that Polychlorinated Biphenyls (PCBs), DDT, Mercury, and Polycyclic Aromatic Hydrocarbons (PAHs) were found above applicable standards in the surface water, sediment, and soil at the site. Table 1. below shows the sampling study, contaminants, level, and the applicable standard.

Study	Sample	Contaminant	Matrix	Result	Standard	Regulatory Level
DOT[1]	SC1	PCBs	Sediment	1.21 ppm	FSQV[2]	0.021 ppm
"	CD2	PCBs	Sediment	0.41 ppm	FSQV	0.021 ppm
Hart Crowser[3]	GL-Sed-02	DDT	Sediment	0.012 ppm	FSQV	0.0016 ppm
"	GL-SW-01	Mercury	Ground Water	0.2 ppb	WAC 173-201A[4]	0.012 ppb
"	GL-SS-01	Benzo(a)anthracene	Soil	0.15 ppm	MTCA A[5]	0.1 ppm
"	GL-SS-01	Benzo(a)pyrene	Soil	0.14 ppm	MTCA A	0.1 ppm
"	GL-SS-01	Benzo(b)fluoranthene	Soil	0.12 ppm	MTCA A	0.1 ppm
"	GL-SS-02	Chrysene	Soil	0.18 ppm	MTCA A	0.1 ppm
"	GL-SS-07	Benzo(b)fluoranthene	Soil	0.4 ppm	MTCA A	0.1 ppm
"	GL-SS-07	Benzo(k)fluoranthene	Soil	0.4 ppm	MTCA A	0.1 ppm

Table 1. Contaminants that Exceed Standards

In addition, other substances were identified at the site. They are arsenic, cadmium, copper, lead, nickel, zinc, bis(2-Ethylhexyl)phthalate, butylbenzylphthalate, and Total Petroleum Hydrocarbons- diesel and heavy oil.

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[1] Washington State Department of Transportation letter and analytical results from Darin Cramer to Michelle Miller dated April 17, 1997.

[2] Freshwater Sediment Quality Values from Creation and Analysis of Freshwater Sediment Quality Values in Washington State, Department of Ecology, July 1997

[3] Site Hazard Assessment, Gorst Landfill, Gorst, WA by Hart Crowser, October 13, 2000.

[4] WAC 173-201A Water Quality Standards – Surface Waters – Freshwater -Chronic

[5] WAC 173-340 Model Toxics Control Act – Table 740-1 Method A Soil Cleanup Levels for Unrestricted Landuses

Drinking Water/Ground Water

There are approximately 1000 residences that have drinking water supplied from two public drinking water wells within 1000 feet of the site. Down gradient of the site are three drinking water wells that supply the City of Bremerton. These wells are approximately 1.25 miles from the site and the site has been determined to be in the within the 5 year travel time to the well. Groundwater in the area travels predominantly to the northeast. The three production wells lie to the direct northeast of the landfill site. The approximate number of persons that have drinking water supplied from these wells is 10,000.

Special Considerations (Include limitations in site file data or data which cannot be accommodated in the model, but which are important in evaluating the risk associated with the site, or any other factor(s) over-riding a decision of no further action for the site.)

The 1997 slope failure of the landfill was a result of partial blockage of the culvert beneath the landfill. Backed up stormwater that could not drain through the culvert ran over the top of the landfill causing the slope to saturate and collapse into the ravine where the downstream culvert daylights. Landfill waste and soil were deposited in Gorst Creek and along its banks.

The collapse of the slope above Gorst Creek on the downhill side would block the culverts under State Route 3 and possibly cause the road to be washed out.

ROUTE SCORES:

Surface Water/Human Health:	45.4	Surface Water/Environ:	90.7
Air/Human Health:	9.7	Air/Environmental:	19.6
Groundwater/Human Health:	50.9		
		OVERALL RANK:	1

WORKSHEET 2
ROUTE DOCUMENTATION

1. SURFACE WATER ROUTE -

List those substances to be considered for scoring: Source: 1

Lead, cadmium, benzo[a]anthracene, benzo[b]fluoranthene, PCBs

Explain basis for choice of substance(s) to be used in scoring. Source: 1

The above substances were identified from sediment/soil/surface water samples taken from the site.

List those management units to be considered in scoring: Source: 1

contaminated soil and sediment

Explain basis for choice of unit to be considered in scoring.

Release of contaminants in the landfill to Gorst Creek water and sediment.

2. AIR ROUTE

List those substances to be considered for scoring: Source: 1

Lead, cadmium, benzo(a)pyrene, mercury

Explain basis for choice of substance (s) to be used in scoring:

The above substances were identified in soil, sediment or water samples taken from the site.

List those management units to be considered in scoring: Source: 1

Contaminated soils/ sediment at the landfill.

Explain basis for choice of unit to be considered in scoring:

Contaminated soils with no dust control or cover.

3. GROUND WATER ROUTE

List those substances to be considered for scoring: Source: 1

Lead, cadmium, benzo[a]anthracene, benzo[b]fluoranthene, PCBs.

Explain basis for choice of substance (s) to be used in scoring:

The above substances were identified from soil, sediment and water samples taken from the site.

List those management units to be considered in scoring: Source: 1

Contaminated soils/sediment and surface water contacting groundwater.

Explain basis for choice of unit to be considered in scoring:

Waste buried in the landfill has contaminated soils and surface waters at the site.

WORKSHEET 4
SURFACE WATER ROUTE

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

Substance	Drinking Water Standard (ug/l)	Val.	Acute Toxicity (mg/kg-bw)	Val.	Chronic Toxicity (mg/kg/day)	Val.	Carcinogenicity WOE	PF	Val.
lead	5	8	ND	ND	ND	ND	ND	ND	ND
cadmium	5	8	225	5	0.0005	5	B1	0.13	ND
benzo[a]anthracene	0.2	10	ND	ND	ND	ND	B2	11.5	7
benzo[b]fluoranthene	0.2	10	ND	ND	ND	ND	B2	11.5	7
PCBs	0.5	10	1315	3	ND	ND	B2	7.7	6

Source: 1, 4
Highest Value: 10
2 Bonus Points? 2
Final Toxicity Value 12

1.2 Environmental Toxicity

(X) Freshwater
( ) Marine

Substance	Acute Criteria (ug/l)	Val.	Non-human Mammalian Acute Toxicity (mg/kg)	Val.
lead	82	6		
cadmium	3.9	8		
pcbs	20	10		
mercury	2.4	8		

Source: 4 Value: 10

1.3 Substance quantity

Source: 1 Value: 9

Explain basis: Surface area approximately 2 acres

2.0 MIGRATION POTENTIAL

2.1 Containment

Source: 1,3 Value: 10

Explain basis: no run-on/runoff control

2.2 Surface Soil Permeability: piped to , adjacent to surface water

Source: 1,3,8 Value: 7

2.3 Total Annual Precipitation: 56 inches/year

Source: 3,5a Value: 4

2.4 Max. 2-Yr/24-hour Precipitation: 3 inches

Source: 3 Value: 3

2.5 Flood Plain: Not in a flood plain

Source: 1 Value: 0

WORKSHEET 4 (CONTINUED)
SURFACE WATER ROUTE

2.6 Terrain Slope: >8% — Source: 1 Value: 5

3.0 TARGETS

3.1 Distance to Surface Water: (<1,000 feet) — Source: 1 Value: 10

3.2 Population Served within 2 miles: None. — Source: 1,7 Value: 0

3.3 Area Irrigated within 2 miles: None. Due to heavy rainfall in the area — Source: 1 Value: 0

3.4 Distance to Nearest Fishery Resource: <1,000 ft — Source: 7 Value: 12

3.5 Distance to, and Name (s) of, nearest Sensitive Environment (s) : Less than 1,000 ft for fisheries resource — Source: 1 Value: 12

4.0 RELEASE

Explain basis for scoring a release to surface water: confirmed release to surface waters/ contaminated sediment — Source: 1 Value: 5

WORKSHEET 5
AIR ROUTE

1.0 SUBSTANCE CHARACTERISTICS

1.1 Introduction (WARM Scoring Manual) - Please review before scoring.

1.2 Human Toxicity

Substance	Air Standard (ug/m3)	Val.	Acute Toxicity (mg/kg)	Val.	Chronic Toxicity (mg/kg/day)	Val.	Carcinogenicity WOE	PF	Val.
lead	0.5	10	ND	ND	ND	ND	ND	ND	ND
cadmium	0.00056	10	25	ND	ND	ND	B1	6.1	6
benzo(a)pyrene		10	ND	ND	ND	ND	B2	ND	ND
mercury		10	ND	ND	8.50E-05	8	ND	ND	ND

Source: 1,4
Highest Value: 10
2 Bonus Points? 2
Final Toxicity Value 12

1.3 Mobility (Use numbers to refer to above listed substances)

1.3.1 Gaseous Mobility — Source: _____ Value: _____
Henry's Law Constant: not applicable

1.3.2 Particulate Mobility — Source: 3 Value: 2
Soil type: Loamy sand
Erodibility: 134
Climactic Factor: 1-10

1.4 Highest Human Health Toxicity/Mobility Matrix Value (from Table A-7) equals **Final Matrix Value:** 12

1.5 Environmental Toxicity/Mobility — Source: 4

Substance	Non-human Mammalian Toxicity (mg/m3)	Value	Mobility	Value	Matrix Value
Cadmium	25 (rat)	10	partic.	2	10

1.5 Highest Environmental Toxicity/Mobility Matrix Value (from Table A-7) equals
Final Matrix Value 10

1.6 Substance Quantity: — Source: 1,3 Value: 7
Explain basis approximately 2 acres

2.0 MIGRATION POTENTIAL

2.1 Containment: Landfill; no cover — Source: 3 Value: 10

WORKSHEET 5 (CONTINUED)
AIR ROUTE

3.0 TARGETS

3.1 Nearest Population: 1,000-2,000 feet — Source: 1,3 Value: 8

3.2 Distance to, and Name (s) of, Nearest Sensitive Environment (s) habitat for endangered species freshwater wetlan >3000 to 4000 feet — Source: 1,3,7 Value: 3

3.3 Population within 0.5 miles: 20 homes at 3 people per home = square root of 60 persons — Source: 7 Value: 8

4.0 RELEASE

Explain basis for scoring a release to air: None confirmed — Source: 1,3 Value: 0

WORKSHEET 6
GROUND WATER ROUTE

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

Substance	Drinking Water Standard (ug/l)	Val.	Acute Toxicity (mg/kg-bw)	Val.	Chronic Toxicity (mg/kg/day)	Val.	Carcinogenicity WOE	PF	Val.
lead	5	8	ND	ND	ND	ND	B2	ND	ND
cadmium	5	8	225	5	0.0005	5	B1	ND	ND
benzo[a]anthracene	0.2	10	ND	ND	ND	ND	B2	11.5	7
benzo[b]fluoranthene	0.2	10	ND	ND	ND	ND	B2	11.5	7
pcbs	0.5	10	1315	3	ND	ND	B2	7.7	6
mercury	2	8	ND	ND	0.0003	5	ND	ND	ND

Source: 1,3,4
Highest Value: 10
2 Bonus Points? 2
Final Toxicity Value: 12

1.2 Mobility (Use numbers to refer to above listed substances) Source: 1,3,4 Value: 3

Solubility not applicable

Cations/Anions cadmium 3
lead 2

1.3 Substance Quantity Source 1,3 Value: 9
Explain basis: Approximately 30,000 cubic yards

2.0 MIGRATION POTENTIAL

2.1 Containment landfill: No Liner (3), No cover (2), Source: 1,3 Value: 7
Explain basis: No leachate collection (2), No liquids (0)

2.2 Net Precipitation (N-A):Total (42) - Evap (5) = 37 inches Source: 3,5c Value: 4

2.3 Subsurface Hydraulic Conductivity: gravelly sand, silty sand Source: 1,3,8 Value: 3

2.4 Vertical Depth to Ground Water: >0-25 Source: 3, 8 Value: 8

3.0 TARGETS

3.1 Ground Water Usage: Public and private supplies with alternates available Source: 3, 7, 9 Value: 4

3.2 Distance to Nearest Drinking Water Wel >1,300 -2,640 feet Source: 3, 7, 9 Value: 3

3.3 Population Served within 2 Miles: Greater than 10,000 Source: 3, 7, 9 Value: 100

WORKSHEET 6
GROUND WATER ROUTE (CONTINUED)

3.4 Area Irrigated by (Groundwater) Wells within 2 miles: NO AREA IRRIGATED Source: NA Value: 0

4.0 RELEASE

Explain basis for scoring a release to ground water: None Source: 1,3 Value: 0

Sources Used in Scoring

1. Bremerton-Kitsap County Health District Site Visits and Site Sampling Reports
2. Kitsap County Stormwater Management Ordinance and Design manual, April 1997.
3. Washington Department of Ecology, WARM Scoring Manual, April, 1992.
4. Washington Department of Ecology, Toxicology Database for Use in Washington Ranking Method
5A. Kitsap County Groundwater Management Plan, Volume I, July 1989.
5B. Kitsap County Groundwater Management Plan, Volume II, April 1991.
5C. Kitsap County Groundwater Management Plan, Volume III, April 1996
6. BKCHD GIS system for Kitsap County topographic information
7. EPA Site Info, April 2001
8. Soil Survey of Kitsap County Area, WA, United States Department of Agriculture, Soil Conservation Service, September 1980
9. Bremerton-Kitsap County Health District Well Log Database, 2001
10. Washington State Department of Ecology, Model Toxics Control Act Cleanup Levels and Risk Calculations Update August 2001.

PATHWAY SCORING FORMULAE WITH WEIGHTING AND NORMALIZATION FACTORS

Air Route - Human Health Pathway

AIR = (SUB X 60/329) X {REL + (TAR X 35/85} / 24 = 9.71

where AIR = Pathway score for Air-Human Health =
SUB = (Human Toxicity Value + 5) X (Containment +1) + Substance Quant 194

REL = Release to Air = 0
TAR = Nearest population + Population within 1/2 mile = 16

Air Route - Environmental Pathway

AIR = (SUB X 60/329) X {REL + (TAR X 35/85} / 24 = 19.60

where AIR = Pathway score for Air-Environmental =
SUB = (Env. Toxicity Value + 5) X (Containment +1) + Substance Quantity 172

REL = Release to Air = 0
TAR = Nearest Sensitive Environment = 3

Surface Water Route - Human Health Pathway

SW = (SUB X 40/175) X {(MIG X 25/24)) + REL + (TAR X 30/115)} / 24 = 45.41

where SW = Pathway Score for Surface Water-Human Health =

SUB = (Human Toxicity + 3) X (Containment + 1) + Substance Quantity = 174

MIG = Soil Permability + Annual Precip. + Rainfall Frequency + Floodplain + Slope = 19

REL = Release to the Surface Water = 5

TAR = Distance to Surface Water + Population Served by Surface Water + Area Irrigated = 10

Table 2 (Continued)

Surface Water Route - Environmental Pathway

SW = (SUB X 40/175) X {(MIG X 25/24)) + REL + (TAR X 30/115)} / 24 = **90.72**

where SW = Pathway Score for Surface Water-Environmental =

SUB = (Env. Toxicity + 3) X (Containment + 1) + Substance Quantity = 152

MIG = Soil Permability + Annual Precip. + Rainfall Frequency + Floodplain + Slope = 19

REL = Release to the Surface Water = 5

TAR = Distance to Nearest Surface Water + Distance to Fisheries Resource + Distance to Sensitive Environment = 34

Ground Water Route - Human Health Pathway

GW = (SUB X 40/208) X {(MIG X 25/17) + REL + (TAR X 30/165)} / 24 = **50.89**

GW = Pathway Score For Ground Water-Human Health =
SUB = (Human Toxicity + Mobility + 3) X (Containment + 1) + Substance Quantity = 153
MIG = Depth to Aquifer + Net Precipitation + Hydraulic Conductivity = 15

REL = Release to the Ground Water = 0
TAR = Aquifer Use + Well Distance + Population Served + Area Irrigated = 107